

=> file reg

FILE 'REGISTRY' ENTERED AT 14:25:04 ON 09 NOV 2005
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=> d his

FILE 'REGISTRY' ENTERED AT 14:05:13 ON 09 NOV 2005

E VANADYL SULFATE/CN
L1 7 S E7-E13
E VANADIUM TRIOXIDE/CN
L2 1 S E3
E SULFURIC ACID/CN
L3 1 S E3

FILE 'HCA' ENTERED AT 14:12:49 ON 09 NOV 2005

L4 2601 S L1 OR VANADYL#(W)(SULFATE# OR SULPHATE#) OR VOSO4 OR VO
L5 3941 S L2 OR (VANADIUM# OR DIVANADIUM# OR V)(W)TRIOXIDE# OR V2
L6 417499 S L3 OR (SULFURIC# OR SULFERIC# OR SULPHURIC# OR SULPHERI
L7 18 S L4 AND L5 AND L6
L8 QUE OXIDN# OR OXIDA? OR OXIDI?

FILE 'REGISTRY' ENTERED AT 14:15:15 ON 09 NOV 2005

E HYDROGEN PEROXIDE/CN
L9 1 S E3

FILE 'HCA' ENTERED AT 14:16:08 ON 09 NOV 2005

L10 183668 S L9 OR HYDROGEN#(A)PEROXIDE# OR H2O2

FILE 'REGISTRY' ENTERED AT 14:16:11 ON 09 NOV 2005

E SODIUM PEROXIDE/CN
L11 1 S E3
E POTASSIUM PERMANGANATE/CN
L12 1 S E3
E IODINE/CN
L13 1 S E3
E POTASSIUM IODATE/CN
L14 1 S E3
E POTASSIUM BROMATE/CN
L15 1 S E3
E BROMINE/CN
L16 1 S E3
E AMMONIUM PERSULFATE/CN
L17 1 S E3

L18 E SODIUM PERSULFATE/CN
3 S E3
L19 E POTASSIUM PERSULFATE/CN
1 S E3
L20 E CERIUM SULFATE/CN
2 S E3
E POTASSIUM DICHROMATE/CN
L21 1 S E3
L22 14 S L11-L21

FILE 'HCA' ENTERED AT 14:21:06 ON 09 NOV 2005

L23 116257 S L22
L24 2 S L7 AND (L10 OR L23)
L25 16 S L7 NOT L24

=> file hca

FILE 'HCA' ENTERED AT 14:25:10 ON 09 NOV 2005

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=> d l24 1-2 ibib abs hitstr hitind

L24 ANSWER 1 OF 2 HCA COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 140:18013 HCA
TITLE: Process for the preparation of **vanadyl sulfate** solution
INVENTOR(S): Dormehl, Andries Gerhardus; Monaghan, Patrick Albert
PATENT ASSIGNEE(S): Highveld Steel and Vanadium Corporation Limited, S. Afr.
SOURCE: PCT Int. Appl., 10 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

(this case)

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2003101893	A1	20031211	WO 2003-IB2002	20030526

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,
CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD,
GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ,
LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,
NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SI, SK, SL,
TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW

RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ,
BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,
SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,
NE, SN, TD, TG

CA 2487956 AA 20031211 CA 2003-2487956

200305
26

EP 1511691 A1 20050309 EP 2003-756074

200305
26

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU,
SK

JP 2005528314 T2 20050922 JP 2004-509591

200305
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US 2005220898 A1 20051006 US 2005-516372

200506
01

PRIORITY APPLN. INFO.:

ZA 2002-4382

A

200205
31

WO 2003-IB2002

W

200305
26

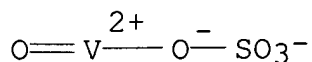
AB A process for producing a **vanadyl sulfate** soln. comprises forming a suspension of **vanadium trioxide** in a **sulfuric acid** soln. and contacting the suspension with a strong oxidizing agent under controlled conditions to produce the **vanadyl sulfate** soln. A preferred oxidizing agent is **hydrogen peroxide**, which is added slowly to the suspension due to the violent nature of the reaction.

IT **27774-13-6P, Vanadyl sulfate**

(prepn. of **vanadyl sulfate** soln. from **vanadium trioxide**)

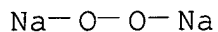
RN 27774-13-6 HCA

CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT 1313-60-6, Sodium peroxide 1314-34-7,
Vanadium trioxide 7553-56-2, Iodine,
 reactions 7664-93-9, **Sulfuric acid**,
 reactions 7722-64-7, Potassium permanganate
 7722-84-1, **Hydrogen peroxide**, reactions
 7726-95-6, Bromine, reactions 7727-21-1, Potassium
 persulfate 7727-54-0, Ammonium persulfate
 7758-01-2, Potassium bromate 7758-05-6, Potassium
 iodate 7775-27-1, Sodium persulfate 7778-50-9,
 Potassium dichromate
 (prepn. of **vanadyl sulfate** soln. from
vanadium trioxide)

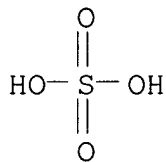
RN 1313-60-6 HCA
 CN Sodium peroxide (Na₂(O₂)) (8CI, 9CI) (CA INDEX NAME)



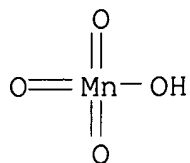
RN 1314-34-7 HCA
 CN Vanadium oxide (V₂O₃) (8CI, 9CI) (CA INDEX NAME)
 *** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
 RN 7553-56-2 HCA
 CN Iodine (8CI, 9CI) (CA INDEX NAME)

I-I

RN 7664-93-9 HCA
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)

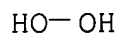


RN 7722-64-7 HCA
 CN Permanganic acid (HMnO₄), potassium salt (8CI, 9CI) (CA INDEX NAME)

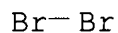


● K

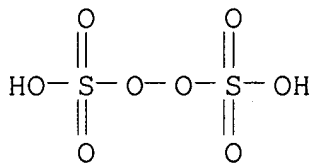
RN 7722-84-1 HCA
 CN Hydrogen peroxide (H₂O₂) (9CI) (CA INDEX NAME)



RN 7726-95-6 HCA
 CN Bromine (8CI, 9CI) (CA INDEX NAME)

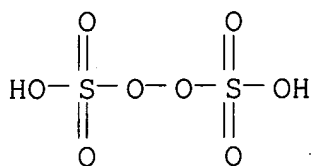


RN 7727-21-1 HCA
 CN Peroxydisulfuric acid ([(HO)S(O)₂]₂O₂), dipotassium salt (9CI) (CA INDEX NAME)



●2 K

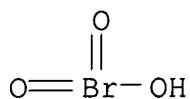
RN 7727-54-0 HCA
 CN Peroxydisulfuric acid ([(HO)S(O)₂]₂O₂), diammonium salt (8CI, 9CI) (CA INDEX NAME)



● 2 NH₃

RN 7758-01-2 HCA

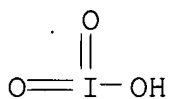
CN Bromic acid, potassium salt (8CI, 9CI) (CA INDEX NAME)



● K

RN 7758-05-6 HCA

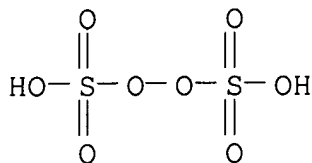
CN Iodic acid (HIO₃), potassium salt (8CI, 9CI) (CA INDEX NAME)



● K

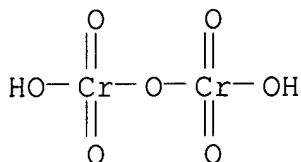
RN 7775-27-1 HCA

CN Peroxydisulfuric acid ([(HO)S(O)₂]₂O₂), disodium salt (8CI, 9CI)
(CA INDEX NAME)



●2 Na

RN 7778-50-9 HCA

CN Chromic acid (H₂Cr₂O₇), dipotassium salt (9CI) (CA INDEX NAME)

●2 K

IC ICM C01G031-02

CC 49-5 (Industrial Inorganic Chemicals)

ST safety **vanadyl sulfate** prepn **vanadium trioxide** oxidn

IT Occupational safety

(prepn. of **vanadyl sulfate** soln. from **vanadium trioxide**)IT **27774-13-6P, Vanadyl sulfate**(prepn. of **vanadyl sulfate** soln. from **vanadium trioxide**)IT **1313-60-6, Sodium peroxide 1314-34-7,****Vanadium trioxide 7553-56-2, Iodine,**reactions **7664-93-9, Sulfuric acid,**reactions **7722-64-7, Potassium permanganate****7722-84-1, Hydrogen peroxide, reactions****7726-95-6, Bromine, reactions 7727-21-1, Potassium**persulfate **7727-54-0, Ammonium persulfate****7758-01-2, Potassium bromate 7758-05-6, Potassium**iodate **7775-27-1, Sodium persulfate 7778-50-9,**Potassium dichromate 21367-17-9, **Sulfuric acid**

, cerium(4+) salt

(prepn. of **vanadyl sulfate** soln. from

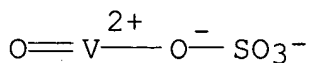
vanadium trioxide)

REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR
THIS RECORD. ALL CITATIONS AVAILABLE IN
THE RE FORMAT

L24 ANSWER 2 OF 2 HCA COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 116:135528 HCA
TITLE: Performance-oriented packaging standards;
changes to classification, hazard communication,
packaging and handling requirements based on UN
standards and agency initiative
CORPORATE SOURCE: United States Dept. of Transportation,
Washington, DC, 20590-0001, USA
SOURCE: Federal Register (1990), 55(246), 52402-729, 21
Dec 1990
CODEN: FEREAC; ISSN: 0097-6326
DOCUMENT TYPE: Journal
LANGUAGE: English

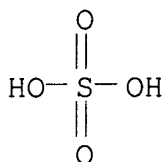
=> d 125 1-16 cbib abs hitstr hitrn

L25 ANSWER 1 OF 16 HCA COPYRIGHT 2005 ACS on STN
142:484739 Process for preparing **vanadyl sulfate** and
use. Li, Linde; Chen, Housheng (Iron & Steel Research Inst.,
Panzhihua Iron & Steel Co., Ltd., Peop. Rep. China). Faming Zhuanli
Shenqing Gongkai Shuomingshu CN 1491898 A 20040428, No pp. given
(Chinese). CODEN: CNXXEV. APPLICATION: CN 2002-133808 20020925.
AB The prepn. process of **vanadyl sulfate** includes
adding **V2O3** and V2O5 into **sulfuric acid**
, filtering and evapg. the filtrate, eliminating cryst. water to
obtain light blue **VOSO4** powder. Compared with available
technol. path, the said technol. process of the present invention
has less steps, mild reaction condition, simple technol. process,
low cost and stable product quality. The filtrate may be used as
the material as electrolyte in vanadium cell.
IT **27774-13-6P, Vanadyl sulfate (**
VOSO4)
(synthesis and use as battery electrolyte)
RN 27774-13-6 HCA
CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT **1314-34-7, Vanadium oxide (V2O3)**

(synthesis of **vanadyl sulfate** from)
 RN 1314-34-7 HCA
 CN Vanadium oxide (V2O3) (8CI, 9CI) (CA INDEX NAME)
 *** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
 IT **7664-93-9, Sulfuric acid**, reactions
 (synthesis of **vanadyl sulfate** from vanadium
 oxides and)
 RN 7664-93-9 HCA
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IT **27774-13-6P, Vanadyl sulfate** (
VOSO4)
 (synthesis and use as battery electrolyte)
 IT **1314-34-7, Vanadium oxide (V2O3)**
 (synthesis of **vanadyl sulfate** from)
 IT **7664-93-9, Sulfuric acid**, reactions
 (synthesis of **vanadyl sulfate** from vanadium
 oxides and)

L25 ANSWER 2 OF 16 HCA COPYRIGHT 2005 ACS on STN

136:104679 Process for the preparation of a **vanadyl**

sulfate solution with a specified molar concentration.

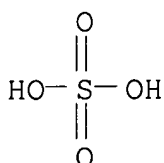
Rohrman, Bodo Rudiger; Dormehl, Andries Gerardus (Highveld Steel
 and Vanadium Corporation Limited, S. Afr.). PCT Int. Appl. WO

2002004353 A2 20020117, 8 pp. DESIGNATED STATES: W: AE, AG, AL,
 AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ,
 DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL,
 IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
 MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK,
 SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY,
 KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY,
 DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT,
 SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO
 2001-IB1203 20010706. PRIORITY: ZA 2000-3491 20000712.

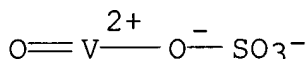
AB A process is disclosed for the prepn. of a **vanadyl**
sulfate soln. with a specified molar concn. from a first
 starting material contg. V2O5 and a second starting material contg.
V2O3. The first and second starting materials are mixed
 together in amts. such that there are substantially equal quantities
 of vanadium in the first and second starting materials. A predetd.
 vol. of a **sulfuric acid** soln. having a predetd.

molar concn. is added to produce a **VOSO₄** soln. having the specified molar concn.

IT **1314-34-7, Vanadium trioxide**
7664-93-9, Sulfuric acid, processes
 (process for prepn. of **vanadyl sulfate** soln.
 with specified molar concn.)
 RN 1314-34-7 HCA
 CN Vanadium oxide (V₂O₃) (8CI, 9CI) (CA INDEX NAME)
 *** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
 RN 7664-93-9 HCA
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IT **27774-13-6P, Vanadyl sulfate**
 (process for prepn. of **vanadyl sulfate** soln.
 with specified molar concn.)
 RN 27774-13-6 HCA
 CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT **1314-34-7, Vanadium trioxide**
7664-93-9, Sulfuric acid, processes
 (process for prepn. of **vanadyl sulfate** soln.
 with specified molar concn.)
 IT **27774-13-6P, Vanadyl sulfate**
 (process for prepn. of **vanadyl sulfate** soln.
 with specified molar concn.)

L25 ANSWER 3 OF 16 HCA COPYRIGHT 2005 ACS on STN
 136:78855 Inorganic-organic hybrids derived from oxovanadium sulfate motifs: synthesis and characterization of [VIVO(.mu.₃-SO₄)(2,2'-bpy)].infin.. Khan, M. Ishaque; Cevik, Sabri; Doedens, Robert J. (Department of Biological, Chemical, and Physical Sciences, Illinois Institute of Technology, Chicago, IL, 60616, USA). Chemical Communications (Cambridge, United Kingdom) (19), 1930-1931 (English) 2001. CODEN: CHCOFS. ISSN: 1359-7345. OTHER SOURCES: CASREACT 136:78855. Publisher: Royal Society of Chemistry.
 AB The hydrothermal reaction of V₂O₅, **V₂O₃**, 2,2'-bpy and Na₂SO₄ in dil. **H₂SO₄** yields a novel hybrid,

[VIVO(.mu.3-SO4)(2,2'-bpy)].infin., which demonstrates the potential of constructing a new class of robust composite solids composed of a {V/O/SO4}-based framework decorated with org. functionalities by combining appropriate **vanadyl sulfate** motifs with a variety of org. ligands.

L25 ANSWER 4 OF 16 HCA COPYRIGHT 2005 ACS on STN

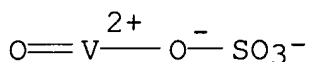
128:310545 Manufacture of vanadium compound electrolyte solutions for redox flow batteries. Makiyama, Ikuo; Ono, Hiroaki; Tada, Shunji; Asai, Junji (Taiyo Mining and Industrial Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 10125345 A2 19980515 Heisei, 4 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1996-299604 19961023.

AB The **VOSO4** electrolyte solns. are prep'd by heating a V oxide (V2O5 or V6O13 based) starting material in a reducing atm. to reduce the oxide to a **V2O3** based oxide, dissolving equal mols of V2O5 and **V2O3** in the reduced oxide with **H2SO4** after dispersing the oxides in water. The starting oxide may be obtained by thermally decomp. NH4VO3 in a sealed container.

IT **27774-13-6P**, Vanadium oxide sulfate (**VOSO4**)
(manuf. of vanadium oxide sulfate electrolyte solns. for redox flow batteries)

RN 27774-13-6 HCA

CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT **27774-13-6P**, Vanadium oxide sulfate (**VOSO4**)
(manuf. of vanadium oxide sulfate electrolyte solns. for redox flow batteries)

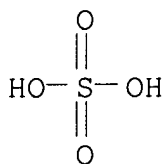
L25 ANSWER 5 OF 16 HCA COPYRIGHT 2005 ACS on STN

110:78735 Recovery of vanadium pentoxide from spent catalysts. Seon, Francoise; Ries, Michel (Rhone-Poulenc Chimie SA, Fr.). Eur. Pat. Appl. EP 290308 A1 19881109, 5 pp. DESIGNATED STATES: R: AT, BE, CH, DE, ES, FR, GB, GR, IT, LI, LU, NL, SE. (French). CODEN: EPXXDW. APPLICATION: EP 1988-400954 19880420. PRIORITY: FR 1987-6089 19870429.

AB The title process consists of treating an aq. suspension of the spent catalyst, e.g., from **H2SO4** manuf., with a gas mixt. contg. 5-20 wt.% SO2 and 10-30 wt.% O, dild. with an inert gas, e.g., N. The gas may be waste gas from the combustion zone of a **H2SO4**-prodn. facility, and the stoichiometric amt. of SO2 for redn. of the V content of the catalyst is used. Thus, 600 g SO2 oxidn. catalyst of compn. V2O5 7.5, K2O 11.7, SO4 25.8, Na 1.2, Al 0.15, and Fe 0.015 wt.%, supported on SiO2, was ground and dispersed

in 375 mL water. The suspension was treated with a gas stream of compn. SO₂ 17, O 17, and N 66 wt.% for 1 h at ambient temp. for SO₂/V₂O₃ ratio 1.0:1.0. The suspension was then filtered to give a soln. of (VO)₂(SO₄)₃ contg. 62 g/L V (as V₂O₅). The filter cake was washed 3 times with water, which was added to the filtrate for 95% recovery of the V, a value comparable to that obtained when pure SO₂ was used to treat the catalyst.

IT **7664-93-9P, Sulfuric acid, preparation**
 (waste gas from manuf. of, in vanadium recovery from spent catalysts)
 RN 7664-93-9 HCA
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)

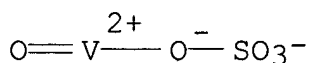


IT **7664-93-9P, Sulfuric acid, preparation**
 (waste gas from manuf. of, in vanadium recovery from spent catalysts)

L25 ANSWER 6 OF 16 HCA COPYRIGHT 2005 ACS on STN
 88:44277 Preparation and study of vanadium(V) sulfates. Tudo, Joseph; Laplace, Gerard (Inst. Univ. Technol. Amiens, Amiens, Fr.). Revue de Chimie Minerale, 14(4), 404-17 (French) 1977. CODEN: RVCMA8. ISSN: 0035-1032.

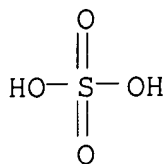
AB The reactions between V₂O₅ and H₂SO₄ or oleums at various temps. gave VO₂(HSO₄)₂, VO₂(HSO₄)₂, V₂O₃(HSO₄)₄, VO(OH)(HSO₄)₂, (H₃O)(VO)(SO₄)₂, V₂O₃(SO₄)₂, and V₂O₃(SO₄)₂·2H₂O. DTA and thermogravimetric curves indicate that V₂O₃(SO₄)₂ has the highest stability of all the compds. The solid-state redn. of V₂O₃(SO₄)₂ by H, SO₂, or H₂S gave a new crystal form, .gamma.-VOSO₄.

IT **27774-13-6P**
 (prepn. of .gamma.-, by redn. of divanadium trioxide disulfate)
 RN 27774-13-6 HCA
 CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT **7664-93-9, reactions**
 (reaction of, with vanadium pentoxide)

RN 7664-93-9 HCA
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IT **27774-13-6P**
 (prepn. of .gamma.-, by redn. of **divanadium trioxide** disulfate)

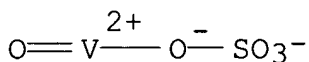
IT **7664-93-9**, reactions
 (reaction of, with vanadium pentoxide)

L25 ANSWER 7 OF 16 HCA COPYRIGHT 2005 ACS on STN
 76:93947 Double sulfates of vanadyl and ammonium. Tudo, Joseph; Tudo, Michele; Laplace, Gerard (Inst. Univ. Technol. Amiens, Amiens, Fr.). Revue de Chimie Minerale, 8(6), 841-50 (French) 1971. CODEN: RVCMA8. ISSN: 0035-1032.

AB An aq. soln. contg. **VOSO4** and (NH4)2SO4 was concd. to a syrup which was triturated with alc. and ether and the solid was dried and washed with H2O to give **VOSO4**.(NH4)2SO4.3H2O. The trihydrate was heated under O at 60.degree./hr to give the monohydrate at 80-116.degree.; the anhyd. salt was obtained at 220.degree.. X-ray powder data for the 2 dehydration products are tabulated. The product formed at 130.degree. was probably **VOSO4**.(NH4)2SO4.-0.25 H2O. The anhyd. salt was heated under O at 30.degree./hr to give successively 2VOSO4.(NH4)2SO4 (contg. some V2(SO4)3.-(NH4)2SO4), 2VOSO4.**H2SO4**, .alpha.-**VOSO4**, and finally V2O5. When **VOSO4**.(NH4)2SO4 was heated from 220 to 400.degree. under a H atm., the final phase was **V2O3**.

IT **27774-13-6P**
 (formation and thermal decompn. of .alpha.-)

RN 27774-13-6 HCA
 CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT **1314-34-7P**
 (formation of, in thermal decompn. of ammonium **vanadyl sulfates**)

RN 1314-34-7 HCA
 CN Vanadium oxide (V2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **27774-13-6P**

(formation and thermal decompn. of .alpha.-)

IT **1314-34-7P**

(formation of, in thermal decompn. of ammonium **vanadyl sulfates**)

L25 ANSWER 8 OF 16 HCA COPYRIGHT 2005 ACS on STN

72:38410 Preparation and study of vanadium(V) sulfates: $V_2O_5 \cdot 2SO_3$ and $V_2O_5 \cdot 4SO_3 \cdot 3H_2O$. Tudo, Joseph; Jolibois, Bernard; Laplace, Gerard (Lab. Chim. Miner., Fac. Sci., Amiens, Fr.). Comptes Rendus des Seances de l'Academie des Sciences, Serie C: Sciences Chimiques, 269(17), 978-80 (French) 1969. CODEN: CHDCAQ. ISSN: 0567-6541.

AB If a soln. of V_2O_5 in concd. **H_2SO_4** is heated at 200.degree., $V_2O_5 \cdot 2SO_3$ is obtained, while $V_2O_5 \cdot 4SO_3 \cdot 3H_2O$ ppts. if the temp. is held at 120.degree.. By heating under dry O, $V_2O_5 \cdot 2SO_3$ starts to decomp. at 360.degree., giving V_2O_5 directly at .apprx.450.degree.. The redn. of $V_2O_5 \cdot 2SO_3$ by pure dry H occurs in 2 steps: at 250-330.degree. the disulfate decomp. to **vanadyl sulfate** which then transforms starting at 360.degree. to give **V_2O_3** at 400.degree.. When heated under dry O, $V_2O_5 \cdot 2SO_3 \cdot 2H_2O$, formed by exposure of the anhyd. salt to moist air, loses its H_2O mols. starting at 140.degree. to give the anhyd. salt at 250.degree., without an intermediate hydrate. When $V_2O_5 \cdot 4SO_3 \cdot 3H_2O$ is heated under dry O, it starts to decomp. at 160.degree. and forms the disulfate at 230.degree.. X-ray diffraction results are presented.

L25 ANSWER 9 OF 16 HCA COPYRIGHT 2005 ACS on STN

71:73779 Removing sulfur oxides from gases. Raman, Anantha K. S. (Esso Research and Engineering Co.). U.S. US 3454356 19690708, 4 pp. (English). CODEN: USXXAM. APPLICATION: US 1966-564198 19660711.

AB Waste gases contg. SO_2 are passed over **V_2O_3** or V_2O_4 or their mixts. at 750-1000.degree.F. The SO_2 reacts with O normally present to form SO_3 which reacts in turn with the **V_2O_3** - V_2O_4 to form **$VOSO_4$** . Regeneration is effected at 1000-1200.degree.F. in presence of SO_2 according to the reaction $2VOSO_4 \rightarrow V_2O_4 + 2SO_3$, and the SO_3 is recovered as by-product **H_2SO_4** . Other oxide coabsorbents (CuO , NiO , Fe_2O_3 , ZnO , Al_2O_3 , or their mixts.) may be used to supplement the **V_2O_3** - V_2O_4 .

IT **1314-34-7**

(sulfur dioxide removal from gas by reaction with)

RN 1314-34-7 HCA

CN Vanadium oxide (V_2O_3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **1314-34-7**

(sulfur dioxide removal from gas by reaction with)

L25 ANSWER 10 OF 16 HCA COPYRIGHT 2005 ACS on STN

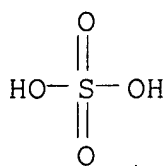
64:98215 Original Reference No. 64:18492a-c The **sulfuric acid** solvent system. VII. Solutions of some tin(IV) and lead(IV) compounds. Gillespie, R. J.; Kapoor, R.; Robinson, E. A. (McMaster Univ., Hamilton). Canadian Journal of Chemistry, 44(10), 1197-202 (English) 1966. CODEN: CJCHAG. ISSN: 0008-4042.

AB cf. CA 60, 15201e. Solns. of Me₄Sn, trimethyltin sulfate, Bu₂Sn(OAc)₂, Ph₄Sn, and triphenyltin hydroxide in 100% **H₂SO₄** were investigated by cryoscopic and conductimetric methods. Me₄Sn reacts with **H₂SO₄** with the evolution of CH₄ and the formation of trimethyltin hydrogen sulfate. Trialkyltin hydrogen sulfates and dialkyltin bis(hydrogen sulfates) behave as strong bases. It is probable that the cationic species formed are protonated hydrogen sulfates rather than "stannonium" ions. Ph-substituted Sn compds. are cleaved in **H₂SO₄** with the formation of benzenesulfonic acid and H₂Sn(HSO₄)₆ and its anions. Pb(OAc)₄ gives yellow solns. contg. H₂Pb(HSO₄)₆ and its anions.

IT **7664-93-9, Sulfuric acid**
(soln. in, of P compds. and V compds., cryoscopy, elec. cond. and ionization of)

RN 7664-93-9 HCA

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



(soln. in, of Pb(IV) and Sn(IV) compds., H sulfato complex formation in)

IT **7664-93-9, Sulfuric acid**
(soln. in, of P compds. and V compds., cryoscopy, elec. cond. and ionization of)

IT **7664-93-9, Sulfuric acid**
(soln. in, of Pb(IV) and Sn(IV) compds., H sulfato complex formation in)

L25 ANSWER 11 OF 16 HCA COPYRIGHT 2005 ACS on STN

63:69073 Original Reference No. 63:12668g-h,12669a **Vanadyl sulfate** and its reduction by hydrogen sulfide: vanadium sulfides. Tudo, Joseph (Fac. Sci., Lille, Fr.). Rev. Chim. Minerale, 2(1), 58-117 (French) 1965.

AB **VOSO₄·6H₂O** is prepd. by evapn. of a soln. contg. 1 mol V₂O₅/mol **H₂SO₄** after redn. with H₂S. **VOSO₄·3H₂O** is obtained at lower acid concn. Hydrates contg. 5, 4, 3, and 1 H₂O

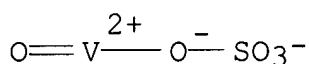
are prepd. by heating **VOSO₄·6H₂O**. The vapor pressures of the 6, 5, 4, and 3 hydrates at 30.degree. are 3.4, 3.2, 2.6, and 2.3 mm. **VOSO₄·3H₂O** decomp. at 93.degree. to **VOSO₄·H₂O**. **VOSO₄** is prepd. from any hydrate at 330.degree.. It crystallizes in the tetragonal system with 2 mols./unit cell, (a = 6.27, c = 4.12 A.). Oxidn. in O at 550.degree. yields V₂O₅. V₆O₁₃ is prepd. at 0.1 mm. and 550.degree.. At lower pressures and higher temps. V₂O₄ is formed. Heating **VOSO₄** in N yields a mixt. of V₂O₅ and V₆O₁₃. Redn. by H at 440.degree. gives **V₂O₃**. Heating in SO₂ gives V₂O₄. **VOSO₄** is reduced quant. at 280.degree. by H₂S to give VS₄. VS₄ in vacuo at 450.degree. gives V₂S₃. Oxidn. of VS₄ with O at 165.degree. gives V₂O₄ and **VOSO₄**. V₂S₃ is reduced by H at 600-720.degree. to V₄S₅ (compn. VS_{1.19} to VS_{1.34}), and at 1000.degree. to VS. The lower V sulfides readily absorb O at 100.degree.. Phases of approx. comp. VS_{0.25}, VS_{0.5}, VS_{1.25}, VS_{0.25}, VS_{1.25}, VS_{0.75}, and VS_{1.50}, stable at 240, 270, 190, 310, and 310.degree., resp., are formed. VS_{1.25} gives VS when heated in vacuo at 370.degree..

IT **12439-96-2, Vanadyl sulfate,**
VOSO₄, pentahydrate 12440-03-8, Vanadyl
sulfate, VOSO₄, monohydrate 19126-73-9,
Vanadyl sulfate, VOSO₄, hexahydrate
41756-89-2, Vanadyl sulfate,
VOSO₄, trihydrate

(decompn., oxidn. and redn. of)

RN 12439-96-2 HCA

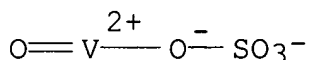
CN Vanadium, oxo[sulfato(2-)-.kappa.O]-, pentahydrate (9CI) (CA INDEX NAME)



● 5 H₂O

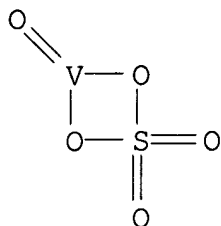
RN 12440-03-8 HCA

CN Vanadium, oxo[sulfato(2-)-.kappa.O]-, monohydrate (9CI) (CA INDEX NAME)



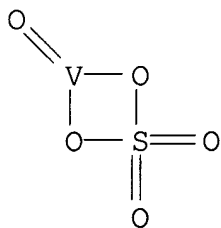
● H₂O

RN 19126-73-9 HCA
 CN Vanadium, oxo[sulfato(2-)-O,O']-, hexahydrate (9CI) (CA INDEX NAME)



●6 H₂O

RN 41756-89-2 HCA
 CN Vanadium, oxo[sulfato(2-)-.kappa.O,.kappa.O']-, trihydrate (9CI)
 (CA INDEX NAME)



●3 H₂O

IT **1314-34-7, Vanadium oxide, V₂O₃**
 (formation of, from **VOSO₄** oxidn. and subsequent redn.)

RN 1314-34-7 HCA

CN Vanadium oxide (V₂O₃) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **12439-96-2, Vanadyl sulfate,**
VOSO₄, pentahydrate 12440-03-8, Vanadyl
sulfate, VOSO₄, monohydrate 19126-73-9,
Vanadyl sulfate, VOSO₄, hexahydrate
41756-89-2, Vanadyl sulfate,
VOSO₄, trihydrate

(decompn., oxidn. and redn. of)

IT **1314-34-7, Vanadium oxide, V₂O₃**

(formation of, from **VOSO₄** oxidn. and subsequent redn.)

L25 ANSWER 12 OF 16 HCA COPYRIGHT 2005 ACS on STN

58:69796 Original Reference No. 58:11945g-h The determination of oxidizing and reducing cations in transition metal oxides using vanadium sulfate solutions. Wickham, D. G.; Whipple, E. R. (Ampex Computer Prods. Co., Culver City, CA). Talanta, 10, 314-15 (English) 1963. CODEN: TLNTA2. ISSN: 0039-9140.

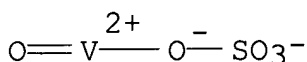
AB Since V sulfate solns. are very stable, they are useful anal. reagents. A soln. contg. V(V) in dil. **H2SO4** can be used to det. Fe(II), Ti(III), and V(III) in solid oxides by titrating the resulting V(IV) with KMnO4. A similar soln. of **VOSO4** can be used to det. Co(III), Mn(III), and Mn(IV) by titrating excess reagent with KMnO4. The method is valuable in studies of ferrites.

IT **27774-13-6, Vanadyl sulfate, VOSO4**

(in analysis)

RN 27774-13-6 HCA

CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



IT **1314-34-7, Vanadium oxide, V2O3**
(vanadium detn. in)

RN 1314-34-7 HCA

CN Vanadium oxide (V2O3) (8CI, 9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **27774-13-6, Vanadyl sulfate, VOSO4**

(in analysis)

IT **1314-34-7, Vanadium oxide, V2O3**
(vanadium detn. in)

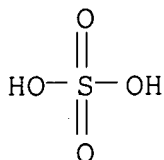
L25 ANSWER 13 OF 16 HCA COPYRIGHT 2005 ACS on STN

30:17714 Original Reference No. 30:2329f-g Is sintering a primary cause of lowered activity of vanadium-barium catalysts?. Adadurov, I. E. Ukrain'skii Khimichnii Zhurnal, 10(Wiss.-tech. Teil), 336-45 (Russian) 1935. CODEN: UKHZAS. ISSN: 0372-4190.

AB cf. C. A. 29, 6371.6, 6371.7. Metallographic examn. of several samples of partly vitrified V-Ba zeolite catalysts, used in a **H2SO4** contact process, disclosed that their reduced activity is caused not only by the adsorption of SO3 on the surface, but also by the gradual decompn. of the complex with the sepn. of V2O5, SiO2, BaO and alkali oxides. V2O5 is reduced by SO2 to **V2O3** and **VOSO4** which escape from the contact space. Under the thermal conditions of the contact process, BaO combines with SiO2 with the formation of stable silicates. This reaction is

accelerated at 575.degree. and higher temps. by the conversion of .beta.-SiO₂ to a highly reactive .alpha.-SiO₂.

IT **7664-93-9, Sulfuric acid**
 (manuf. of, catalysts contg. Ba and V in, effect of sintering on)
 RN 7664-93-9 HCA
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)

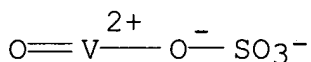


IT **7664-93-9, Sulfuric acid**
 (manuf. of, catalysts contg. Ba and V in, effect of sintering on)

L25 ANSWER 14 OF 16 HCA COPYRIGHT 2005 ACS on STN
 21:5796 Original Reference No. 21:711h-i,712a-d Tervalent vanadium. II.
 Meyer, Julius; Markowicz, Ernst Z. anorg. allgem. Chem., 157,
 211-50 (Unavailable) 1926.
 AB cf. C. A. 18, 3154. The alum, NH₄V(SO₄)₂·12H₂O, was prep'd. from
 NH₄VO₃, and **H₂SO₄** by the action of SO₂ and elec.
 reduction. A concn. of **H₂SO₄** slightly less than
 theoretical yields blue crystals, while more dil. solns. yield red
 crystals. A violet modification which is probably a mixed crystal
 of the red and blue is also mentioned. An exhaustive study of these
 crystals shows no differences in properties, except color. Per cent
 compn., rate of efflorescence and elec. cond. (13-60.degree.) are
 identical. The m. p. is 49-50.degree.; d. is 1.687 at room temp.;
 the soly. is 28.45 g. per 100 g. H₂O at 20.degree.. The soln. is
 slowly oxidized by air, giving **VOSO₄**. The 2 modifications
 are interconvertible. Pure NH₄V(SO₄)₂·12H₂O is blue, and the red
 modification contains traces of **V₂O₃** or V(OH)₃ from
 hydrolysis. In a similar way the alum, KV(SO₄)₂·12H₂O, was prep'd.,
 but analogous modifications could not be obtained. By slight
 modifications in the same method, green vanadic hydrogen sulfate
 tetrahydrate, HV(SO₄)₂·4H₂O, the hexahydrate, HV(SO₄)₂·6H₂O,
 ammonium vanadic sulfate tetrahydrate, NH₄V(SO₄)₂·4H₂O and the
 hexahydrate, NH₄V(SO₄)₂·6H₂O, were prep'd. A series of compds. was
 prep'd. from V(AcO)₃ soln. This soln. was prep'd. from a suspension
 of reactive V₂O₅ in AcOH by reduction with hydrazine. Addn. of
 fuming **H₂SO₄** to the acetate soln. yields hygroscopic
 penta-, hexa- and octahydrates of vanadic hydrogen sulfate. If
 NH₄VO₃ is used instead of V₂O₅, the tetra- and pentahydrates of
 ammonium vanadic sulfate are formed. Addn. of 60% **H₂SO₄**
 to the acetate soln. yields dark green nona- and decahydrates of
 vanadic sulfate. The nonahydrate absorbs H₂O from the air in amts.

which indicate the formation of $V_2(SO_4)_3 \cdot 14H_2O$. Warm solns. of the vanadic hydrogen sulfates in concd. **H₂SO₄** yield vanadic sulfate trihydrate and vanadic hydrogen sulfate dihydrate. Anhyd. vanadic hydrogen sulfate and the monohydrate are formed from hot concd. **H₂SO₄** and $V(AcO)_3$ (analytical data not given). Distn. of AcOH from the acetate soln. contg. concd. **H₂SO₄** and subsequent addn. of pyridine yields 2 hydrated addn. compds. of pyridine and vanadic hydrogen sulfate, green $HV(SO_4)_2 \cdot C_5H_5N \cdot 3H_2O$ and yellow $HV(SO_4)_2 \cdot C_5H_5N \cdot H_2O$. Attempts to prep. normal selenates and selenate alums were unsuccessful. Addn. of selenic acid to $V(AcO)_3$ soln. produces the following light-green hygroscopic hydrated vanadic aceto-selenates, $V_3(AcO)(SeO_4)_4 \cdot 10H_2O$, $V_3(AcO)(SeO_4)_4 \cdot 14H_2O$, and $V_3(AcO)(SeO_4)_4 \cdot 18H_2O$. The structures of the various compds. are discussed with respect to the Werner theory, and corresponding modifications in the above formulas are given.

- L25 ANSWER 15 OF 16 HCA COPYRIGHT 2005 ACS on STN
 20:21615 Original Reference No. 20:2626a-b Salts and complex compounds of quadrivalent vanadium. Rosenheim, Arthur; Mong, H. Y. Z. anorg. allgem. Chem., 148, 25-36 (Unavailable) 1925.
- AB Alkali **vanadyl sulfates** prepd. by dissolving alkali metavanadates in **H₂SO₄** decompose **H₂SO₄** as follows: $2VIV = VIII + VV$. The crystd. acid **V₂O₃(SO₄)₂** is obtained and crystd. salts of the formula $M_2[V(SO_4)_2]$ ($M = NH_4, K, \text{ or } Na$). **Vanadyl sulfate** behaves in a similar manner. The structure of salts of the type $M_2[(VO)Ra] + aq.$ ($R = \text{tartrate, salicylate radical}$) and the newly prepd. vanadyl hydroxynaphtholate and pyrocatecholate is similar to that of the pyrocatecholates of bivalent metals V is bivalent. Several addn. compds. with org. constituents are prepd. and a Tl salt.
- IT **27774-13-6, Vanadyl sulfate**
 (prepn. of)
- RN 27774-13-6 HCA
- CN Vanadium, oxo[sulfato(2-)-.kappa.O]- (9CI) (CA INDEX NAME)



- IT **27774-13-6, Vanadyl sulfate**
 (prepn. of)

- L25 ANSWER 16 OF 16 HCA COPYRIGHT 2005 ACS on STN
 17:10198 Original Reference No. 17:1780d-e Vanadium from ores. Mackay, P. A. US 1450507 19230403 (Unavailable). APPLICATION: US .
- AB Ores such as those contg. oxides of V and Pb are treated with fuming **H₂SO₄** and **V₂O₅** is reduced to **V₂O₃** by **SO₂** to obtain **vanadyl sulfate**. The soln. is subsequently dild.

with H₂O to ppt. other materials and leave the V in soln.